Manufacturing Careers

Computer-Controlled Machine Tool Operators

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What They Do

A computer-controlled module now carries out many machinist functions formerly performed by human operators. Computer-Controlled Machine Tool Operators, also known as Computer Numerically-Controlled (CNC) Operators, run computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces. After the CNC Programmer completes the programming work, CNC Operators perform the necessary machining operations. They transfer the commands from the server to the CNC control module using a computer network link or floppy disk. Many advanced control modules are "conversational," meaning they ask the operator a series of questions about the nature of the task.

CNC machines cut away material from a solid block of metal, plastic, or glass known as a work piece to form a finished part. Computer Controlled Operators normally produce large quantities of one part, although they may produce small batches or one-of-a-kind items. They use their knowledge of the working properties of metals, and their skill with CNC machines, to carry out the operations needed to make machined products that meet precise specifications.

Alternate titles for these workers include: Senior Machinist and CNC Operator.

Tasks

- Determine specifications or procedures for tooling set-up, machine operation, workpiece dimensions, or numerical control sequences, using blueprints, instructions, and machine knowledge.
- Calculate and set machine controls to position tools, synchronize tape and tool, or regulate cutting depth, speed, feed, or coolant flow.
- Load control media, such as tape, card, or disk, in machine controller or enter commands to retrieve programmed instructions.
- Lay out and mark areas of part to be shot-peened, and fills hopper with shot.
- Select, measure, assemble, and set machine tools, such as drill bits and milling or cutting tools, using precision gauges and instruments.
- Lift workpiece to machine manually, with hoist or crane, or with tweezers.
- Mount, install, align, and secure tools, attachments, fixtures, and workpiece on machine, using hand tools and precision measuring instruments.

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- Start automatic operation of numerical control machine to machine parts or test setup, workpiece dimensions, or programming.
- Confer with supervisor or programmer to resolve machine malfunctions and production errors and obtains approval to continue production.
- Maintain machines and remove and replace broken or worn machine tools, using hand tools.
- Operate lathe, drill-press, jig-boring machine, or other machines manually or semiautomatically.

*Detailed descriptions of this occupation may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.*

Important Skills, Knowledge, and Abilities

- Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
- Operation and Control — Controlling operations of equipment or systems.
- Operation Monitoring — Watching gauges, dials, or other indicators to make sure a machine is working properly.
- Equipment Selection — Determining the kind of tools and equipment needed to do a job.
- Equipment Maintenance — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- Quality Control Analysis — Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- Control Precision — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.
- Number Facility — The ability to add, subtract, multiply, or divide quickly and correctly.
- Reaction Time — The ability to quickly respond (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears.
- Wrist-Finger Speed — The ability to make fast, simple, repeated movements of the fingers, hands, and wrists.

Work Environment

Computer-Controlled Machine Tool Operators wear protective equipment, such as safety goggles to shield against bits of flying metal, and earplugs to dampen machinery noise. They also must exercise caution when handling hazardous coolants and lubricants. The job requires stamina because Operators stand most of the day, and at times, may need to lift moderately heavy workpieces.

Most work a 40-hour week; however, Operators increasingly work evening and weekend shifts as companies justify investments in more expensive machinery by extending hours of operation. Overtime is common during peak production periods.

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California's Job Outlook and Wages

The California outlook and wage below represent the occupation across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Computer-Controlled Machine Tool Operators (Metal and Plastic)				
51-4011	10,700	11,200	230	$11.31 to $19.56

Wages do not reflect self-employment.
***Average annual openings** include new jobs plus net replacements.*
Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

While employment of Computer-Controlled Machine Tool Operators is projected to grow more slowly than the average for all occupations through 2014, the number of replacement workers needed as workers retire or leave for other kinds of work will be significant. In the ten-year period, 1,800 replacement workers will be needed, in addition to the 500 new jobs expected.

The demand for Computer-Controlled Machine Tool Operators is influenced by economic cycles—as the demand for machined goods falls, Operators involved in production may be laid off or forced to work fewer hours.

Training/Requirements/Apprenticeships

Computer-Controlled Machine Tool Operators usually follow one of the following training paths:

- Formal apprenticeship programs
- Vocational and post-secondary school programs
- Community college certificate programs
- Extensive on-the-job training

Many entrants to this occupation have previously worked as machinists or machine setters, operators, and tenders and have a basic knowledge of computers and electronics. Training program titles in California include Machine Shop Technology or Manufacturing Technology, and generally last between one and two years. For information about apprenticeship programs, go to: www.dir.ca.gov/das.

Recommended High School Course Work

Mathematics courses such as trigonometry and algebra, blueprint reading, computer programming, metalworking, and drafting are recommended for high school students.

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Where Do I Find the Job?

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search using keywords from the following manufacturing industry names to get a list of private firms and their addresses:

- Aircraft Engine and Engine Parts
- Aircraft Manufacturing
- All Other Motor Vehicle Parts Manufacturing
- All Other Plastics Product Manufacturing
- Bolts, Nuts, Screws, Rivets, and Washers
- Machine Shops
- Motor Vehicle Power Train Components
- Motor Vehicle Seating and Interior Trim
- Other Motor Vehicle Electrical Equipment
- Precision Turned Product Manufacturing
- Urethane and Other Foam Product Mfg.

Search these **yellow page** headings for listings of private firms:

- Machine Shops
- Machine Tools
- Metal Fabricators
- Sheet Metal Work

Where Can the Job Lead?

Experienced Computer-Controlled Machine Tool Operators can become Numerical Tool and Process Control Programmers, and some are promoted to supervisory or administrative positions in their firms. A few open their own shops.

Other Sources of Information

Precision Machined Products Association
www.pmpa.org

National Tooling & Machining Association
www.ntma.org

Precsion Metalforming Association Educational Foundation
www.pmaef.org

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